United States Department of Agriculture
Research, Education, and Economics

ARS CSREES ERS NASS

Policies and Procedures

Title: Economic Analysis and Decision for ARS Facility Modernization

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Distribution: ARS Headquarters, Areas, Locations

This P&P requires performance of analysis to determine the best method of implementing facility modernization. It establishes the Administrator as the decision authority who decides the method of modernization when *Gutting and Rebuilding* cost is more than 3/4 of *New Replacement Facility cost*.

Table of Contents

1. Introduction

The ARS research facilities are aging and in need of major repair and improvements to effectively support current agency mission activities. Functional, safety and health, and code-related deficiencies are prevalent. Building components (especially mechanical and electrical systems) are rapidly deteriorating due to normal wear and tear and lack of an aggressive preventive or repair and maintenance program.

To correct these condition deficiencies, ARS implemented an Agencywide facility modernization program involving major facility upgrade (i.e., million dollar packages) at high priority research locations selected by the Administrator and the National Program Staff. These modernization sites are selected and prioritized based on criteria which include high priority programs; safety and health of employees; critical mass of scientists; and established centers of excellence for high priority research programs.

In the FY-90 Senate Appropriation Committee Report, the committee acknowledged the important facility modernization efforts being undertaken by ARS but expects those efforts to be supported by economic analyses and that consideration will be given to complete internal rebuilding of existing facilities (*Gutting and Rebuilding*) and to demolishing or abandoning of existing structures and building new facilities (*New Replacement Facility*)--whichever is most feasible.

2. Policy

In implementing modernization of ARS facilities, whenever the total modernization cost is over $1 million, an analysis of alternative methods of modernization shall be performed to determine the best method of correcting building deficiencies. Considering economic and other factors, the analysis shall compare the feasibilities of *Selective Renovation*, *Gutting and Rebuilding*, and *New Replacement Facility*.

This analysis shall be accomplished in conjunction with the planning process for major facilities construction projects outlined in Phase I/Step 1 of the ARS Manual 242.4, Major Facilities Construction.

This policy does not apply to projects involving historic property for which construction activities must comply with national historic preservation laws and regulations.

3. Alternative Methods of Modernization

Selective Renovation

This traditional method of correcting building deficiencies is through the implementation of individual repair and alteration projects. The work may include gutting and rebuilding of the interior spaces of the building on a small-scale basis (i.e., designated laboratories or sections of the building).

Gutting and Rebuilding

This method of modernization is accomplished through complete gutting of the interior space of the existing structure and replacing all interior components (walls, ceilings, etc.), utilities, systems, fixed equipment, and laboratory furniture with new state-of-the-art components. The term gutting refers to a demolition approach back to the structural framework of the building. This modernization approach requires relocation of tenant research operation, personnel, and equipment to a temporary facility.

New Replacement Facility

This method of modernization is accomplished through demolishing or abandoning existing structures and building a replacement facility (at existing or other site). This modernization approach may be considered if the repair and renovation of existing facilities would be impractical. This approach must be supported by the Administrator. Construction of a new replacement facility at an existing building site will require relocation of the tenant research operation, personnel, and equipment to a temporary facility.

4. Determining Best Modernization Approach

General Assumptions and Conditions

To ensure that data and cost estimates for *Gutting and Rebuilding* and *New Replacement Facility* are developed and evaluated on the same basis, the following assumptions and conditions must be made.

- The existing facility can be put out of service. The tenant research operation, personnel, and equipment can be relocated and accommodated in a temporary facility.

- The existing functional use of a facility will not change.

- The existing net-usable square feet area of a facility will not increase. To determine the equivalent gross square feet size of a new replacement facility, use the net-usable square feet area of the existing facility and apply a 60 percent building efficiency. Building efficiency is the ratio of net-usable-to-gross area of a building, expressed in percent.

- Both options will utilize nearly identical systems for building operations such that the difference in lifetime operating and maintenance (O&M) costs between options may be considered insignificant.

Analysis and Decision Process

Step 1 - *Identify/Evaluate Existing Building Deficiencies*

Through performance of a facility condition study performed by an Architect-Engineer (A-E) firm, develop an inventory of existing functional, safety and health, and code-related building deficiencies. Interview pertinent agency/tenant research program personnel to determine their programmatic needs to support current research function as well as any facility enhancements to improve the function.
Interview the building manager and building maintenance staff to determine their O&M needs/problems. Identify and evaluate condition deficiencies in terms of:

- The quality and condition of basic building components and remaining service life.

- The adequacy, suitability, reliability, maintainability, and efficiency of pertinent systems and equipment.

- The adequacy of source equipment capacity and physical plant facilities as they relate to user needs and goals.

- Compliance with the Agency's safety/health regulations.

- Compliance with building and fire code requirements to include fire resistivity rating of building components, horizontal/vertical fire separations, and fire egress.

- Integrity of existing structural members considering seismic requirements for locations subject to high probability of earthquake occurrence.

- The suitability and adaptability of existing structure for current and proposed occupancy and functional use. Consider existing floor design loads, support spaces, ceiling heights, maintainability, and external/internal and horizontal/vertical circulation including barrier-free access for physically disabled individuals.

- Adequacy of the building support services; i.e., elevators, loading docks, and storage areas.

Step 2 - *Determine Building Deficiencies Cost*

Estimate the total cost of design and construction to repair/correct all existing building deficiencies. If the total cost is less than $1 million, it shall be deemed practical to correct building deficiencies through *Selective Renovation*. Otherwise, proceed to Step 3.

Step 3 - *Determine Gutting and Rebuilding Cost*

Estimate the cost of gutting and rebuilding the existing facility. In addition to design and construction cost, include the cost of temporary facility for tenant research operation that would be displaced by the modernization effort. Include moving cost, lease space, and installation of temporary utilities, etc.

Step 4 - *Determine New Replacement Facility Cost*

Estimate the cost of building a replacement facility at the existing or new building site. In addition to design and construction cost, include appropriate cost of land (if acquisition of new land is required), geotechnical surveys, additional site work and new site utilities, demolition of old building structure, moving cost, lease space, and installation of temporary utilities, etc.

Step 5 - *Compare Costs and Determine Preferred Method of Modernization*

Compare building deficiencies cost against gutting and rebuilding cost. Compare gutting and rebuilding cost against new replacement facility cost. Determine preferred method of modernization in accordance with the conditions below:

IF	AND	THEN
Building deficiencies cost is LESS THAN 1/2 of gutting and rebuilding cost	Gutting and rebuilding cost is LESS THAN 3/4 of new replacement facility cost	The preferred modernization method is *Selective Renovation*.

Building deficiencies cost is MORE THAN 1/2 of gutting and rebuilding cost	Gutting and rebuilding cost is LESS THAN 3/4 of new replacement facility cost	Consider *Selective Renovation* or *Gutting and Rebuilding*, whichever is most feasible. (Go to Step 6)
	Gutting and rebuilding cost is MORE THAN 3/4 of new replacement facility cost	Consider *Gutting and Rebuilding* or *New Replacement Facility*, whichever is most feasible and supported by the Administrator. (Go to Step 6.)

Step 6 - *Analyze Tradeoff Between Alternatives*

Identify constraints and other relevant factors which will cause certain alternatives to be infeasible (such as technical, physical, functional, budgetary, and building code requirements). Some of the most important factors to consider are:

- The probable availability of funding to provide for complete modernization or replacement of facility.
- The time schedule constraints to complete the modernization work. Additional time and cost impact of sequencing the construction work under phased modernization implementation.
- The availability of a temporary facility to accommodate the research personnel and equipment that would be displaced by the modernization effort.
- The physical limitation and adaptability of the interior area of the existing building to accommodate the current research program space and volume requirements.
- The effectiveness of probable functional space arrangements and relationships for efficient research operation and added opportunities for research program consolidation.
- The flexibility of the existing structure and configuration for future changes or expanded growth.
- The adequacy of the existing equipment capacity and facilities to support needs.
- The architectural appearance and condition of the existing building compared to others in the area.

- The environmental impact of a new building project relative to site and surrounding area, as described by National Environmental Policy Act, which are more significant with building new structures versus reusing/modernizing existing structures.

- The added opportunities and the ability to reduce O&M costs through improvements in building efficiency while providing adequate space and clearances for equipment, service utility runs, and maintenance.

- The structural integrity of existing structure, particularly in locations subject to high probability of seismic, lateral, and snow loads.

- The ability to comply with building code and safety and health requirements including barrier-free access to physically disabled individuals.

- The existing accessibility, traffic patterns, and parking adequacy of existing facility.

Step 7 - *Recommendation and Administrator Approval*

Obtain necessary approval and direction from the Administrator whether to pursue gutting and rebuilding of the existing facility or to build new replacement facility. Develop recommendation/rationale supporting the preferred method of modernization. Communicate analysis result to the Administrator through the Area Directors (AD) and National Program Staff (NPS).

5. Summary of Responsibilities

Administrator

- Approve initiation of a modernization project.

- Decide the method of modernization to pursue when the cost of gutting and rebuilding is more than 3/4 of the cost to build new replacement facility.

- Provide direction as necessary to assist AD's and NPS in pursuing use of Agency funding and/or congressional authorization and appropriation for the proposed modernization project.

Area Directors

- Develop assessment of respective Area facility modernization and program needs.

- Consult with NPS, Area Administrative Office, and Administrative and Financial ManagementFacilities Division (AFM-FD), and incorporate recommendations as appropriate.

National Program Staff

- Select and prioritize key research locations for modernization in consultation with the Administrator.

- Review and approve preliminary modernization project data, site selection, budget estimate, and justification statement.

- Provide appropriate guidance to AD's.

- Consult with AFM-FD as appropriate.

Area Administrative Offices and Facilities Division

- Assist in development of preliminary modernization project data, design alternatives, site selection, budget estimate, schedule, and other modernization issues.

- Review scope of contract services for facility condition surveys and studies.

- Review data, communicate the analysis results, and recommend the course of action to the Administrator through the Area Directors and National Program Staff.

/s/

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